GaNPower International Inc.

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230 -3410 LOUGHEED HWY
VANCOUVER, BC, V5M 2A4 CANADA

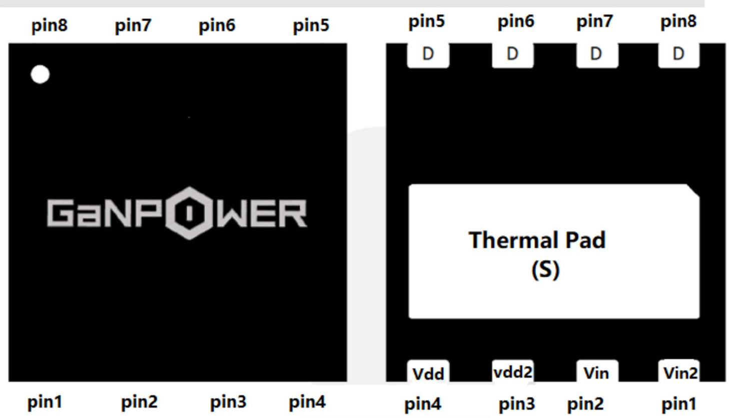
GPIRGIC15DFV

GaN Power IC in DFN8x8 Package

Datasheet version: 2.9

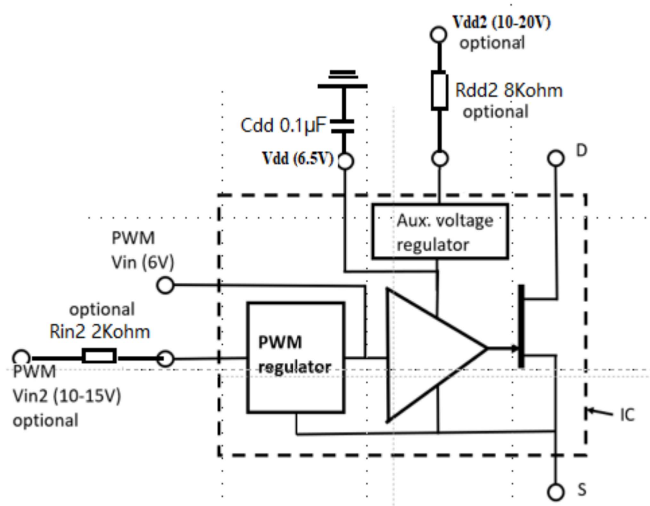
Features

BV_{dss}	Rdson	DC bus	I_{ds}
900 V	85 mΩ	400-600 V	15A



- Ultra-low R_{DS}(on)
- High dv/dt capability
- Fast switching
- Low Profile
- Suitable for DC bus voltage of 400-600 V

Applications



- Switching Power Applications
- Power adapters and power delivery chargers
- Start up procedure: Please set Vdd to be a normal operation voltage (e.g., 6.5 V) before turning on the high voltage power supply or apply high voltage to the drain. Vdd is the power supply for the internal gate driver in our GaN Power IC. Only when a normal operation voltage is applied to Vdd (e.g., 6.5 V), will the internal driver and GaN HEMT work properly. Alternately, Vdd2 (e.g., 8-20 V) can be used to replace Vdd.
- Application configurations: PWM options: 1) Vin2-open, Vin(PWM)=6.5 V or 2) Vin-open, Vin2(PWM)=8-15V. Auxiliary power options: 1) Vdd2-open; Vdd=6.5V or 2) Vdd connected to 0.1uF, Vdd2=8-30V (e.g. 15V) connected to secondary of transformer. Rin2 and Rdd2 are optional resistors (Rin2 and Rdd2 shall be optional if internal auxiliary supply overvoltage is a concern. So far no evidence of such issue).

Description

These devices are power IC based on Power GaN HEMTs using proprietary E-mode GaN on silicon technology. The voltage regulator and gate driver are integrated with the main power transistor resulting in large-voltage tuning range, fast switching, high system power density and low cost.

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Device Characteristics

Basic Parameters				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	BV_{dss}	Drain-Source breakdown voltage	V_{in}=0V, V_{dd}=6.5V, I_d<30uA	900			V
2	R_{dson}	Static drain-source on resistance, T_C = 25℃	V_{in}=6V, V_{dd}=6.5V, I_d=2.5A,		85	105	mΩ
3	R_{dson}	Static drain-source on resistance, T_C = 125℃	V_{in}=6V, V_{dd}=6.5V, I_d=2.5A,		170		mΩ
4	V_{dd}	Drive supply voltage		5	6.5	8	V
5	V_{in}	PWM input voltage		3	5	8	V
6	V_{dd2}	Aux voltage regulator voltage		8	15	30	
7	V_{in2}	PWM regulator voltage		8	15	20	
8	I_{ddq}	Drive supply (V_{dd}) quiescent leakage current	V_{dd}=6.5V		1.9		µA
9	I_{ddq}	Drive supply (V_{dd}) quiescent leakage current	V_{dd2}=15V		290		µA

Switching Performance				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	$t_{d(on)}$	Turn-on delay time	V_{bus}=600V, I_d=1.8A, V_{in2}=10V, V_{dd2}=15V		20		ns
2	t_r	Rise time			18		ns
3	$t_{d(off)}$	Turn-off delay time			27		ns
4	t_f	Fall time			32		ns

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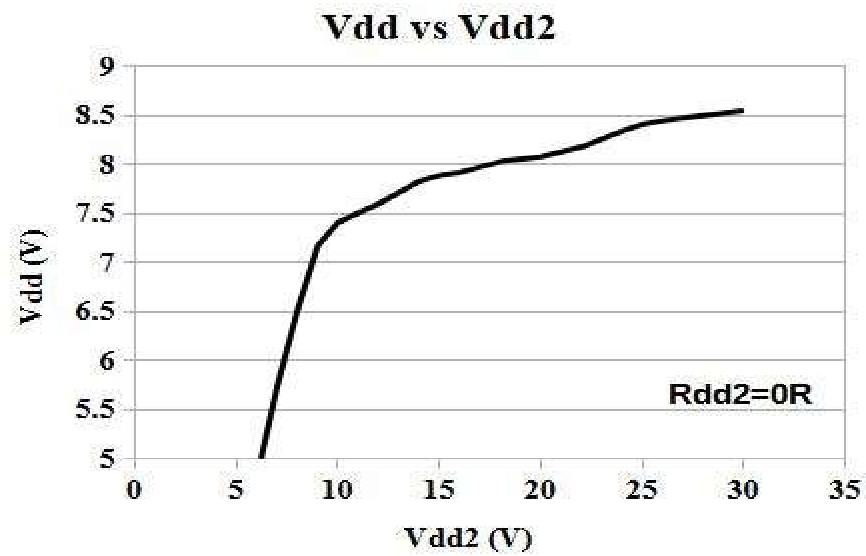
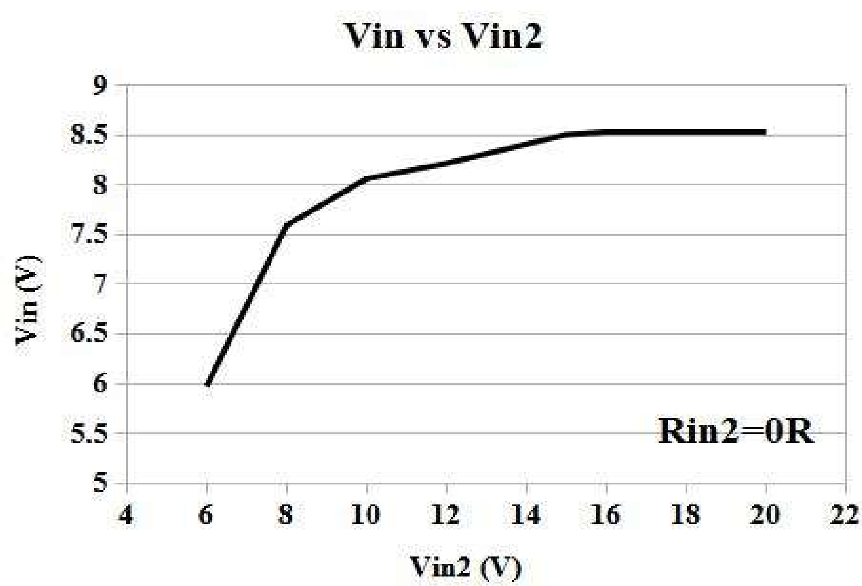
Electrical Performance

Vdd vs Vdd2 @DC
(Vin=0 V, Rdd2=0kΩ)



Vin vs Vin2 @DC
(Vdd=6.5V, Rin2=0kΩ)



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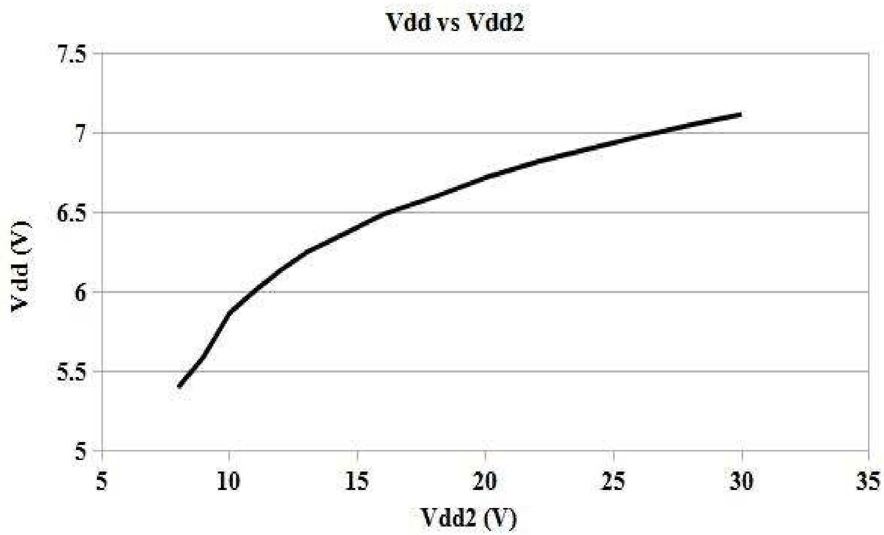
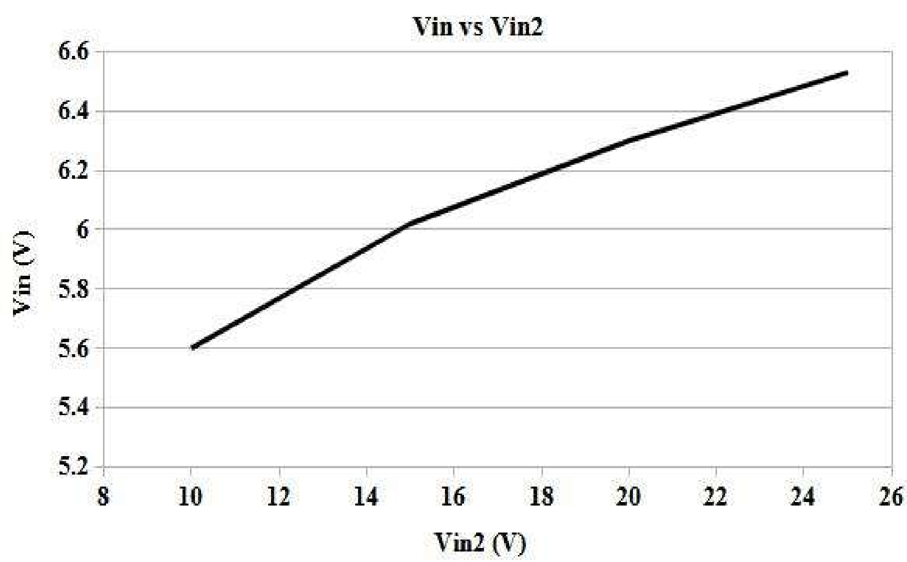
Vdd vs Vdd2 @DC
(Vin=0 V, Rdd2=8kΩ)



Vin vs Vin2 @DC
(Vdd=6.5V, Rin2=2kΩ)



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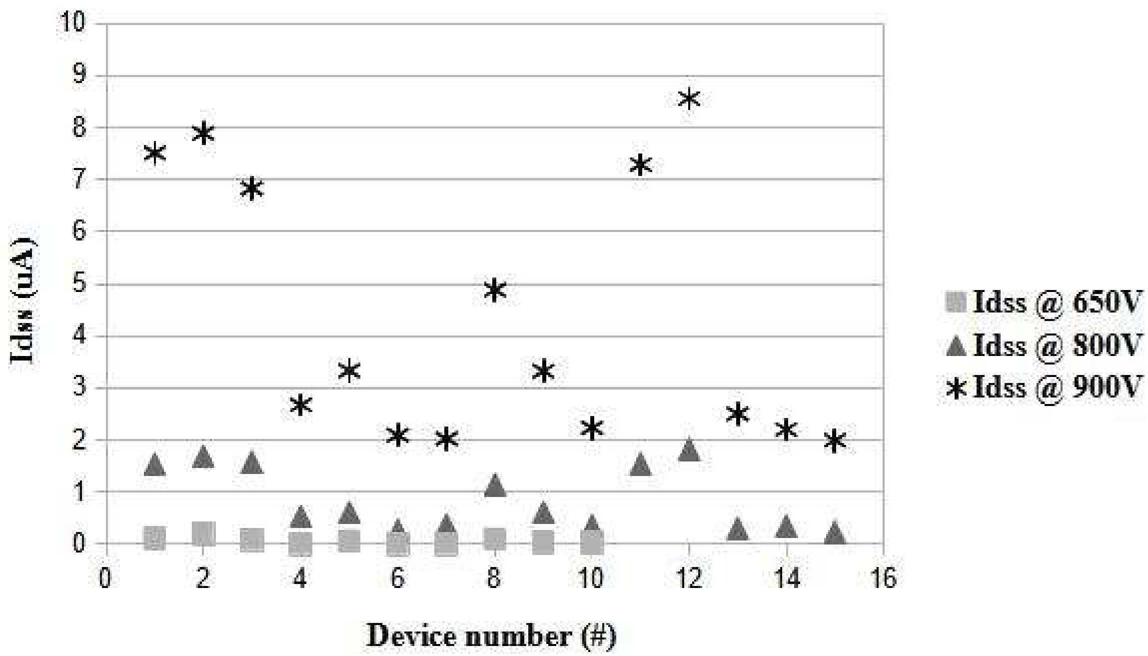
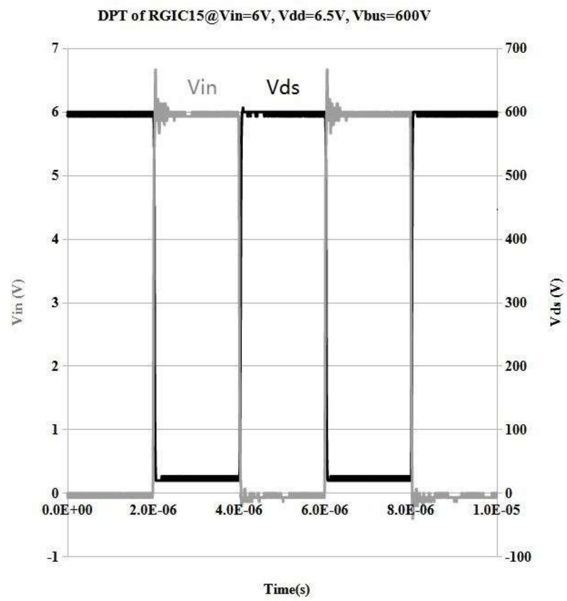
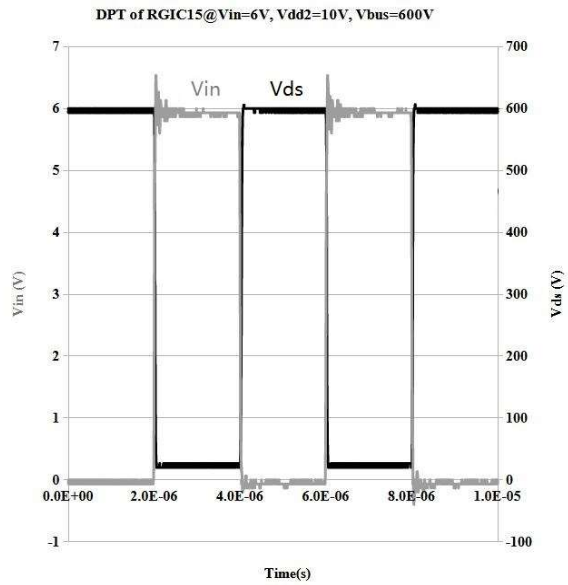
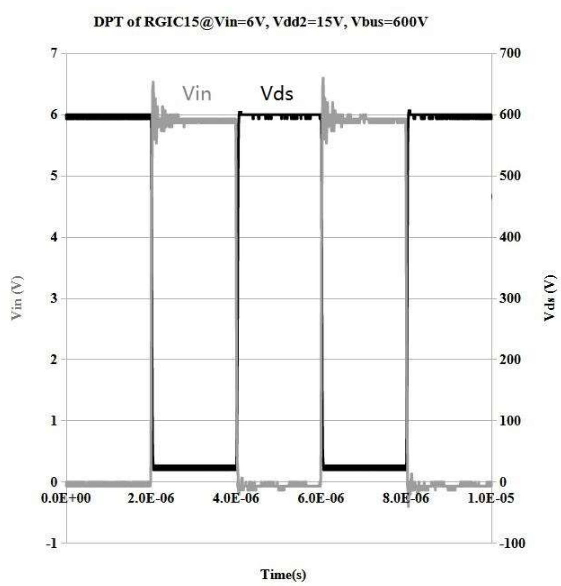




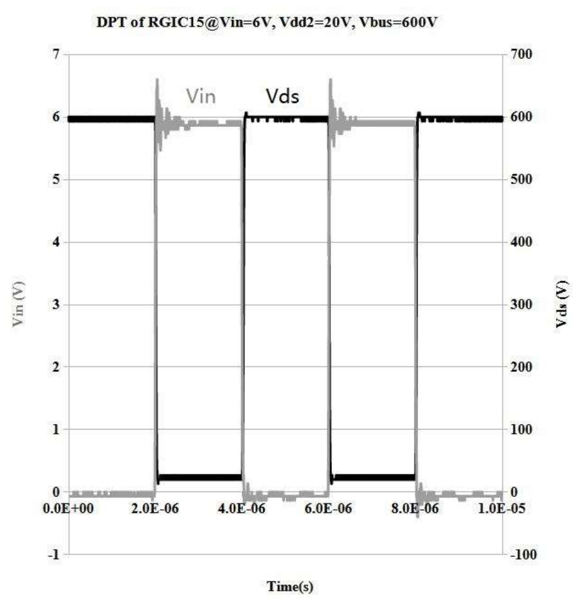
DPT test @V_{in}=6V, V_{dd}=6.5V, V_{bus}=600V, R_{in}=0, R_{dd}=0



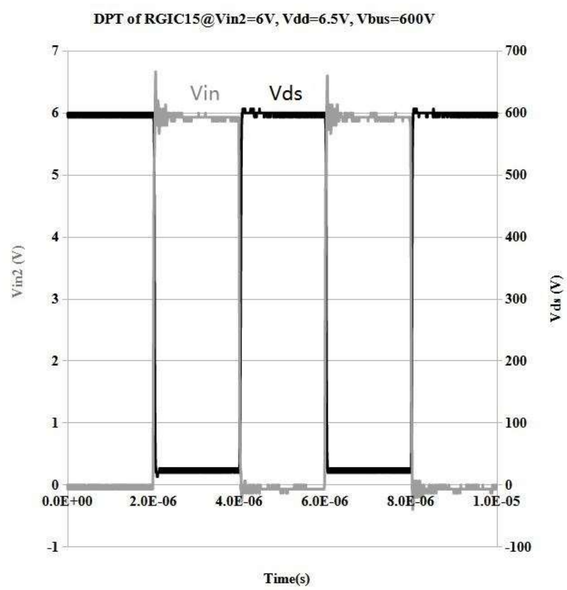
DPT test @V_{in}=6V, V_{dd2}=10V, V_{bus}=600V, R_{in}=0, R_{dd}=0



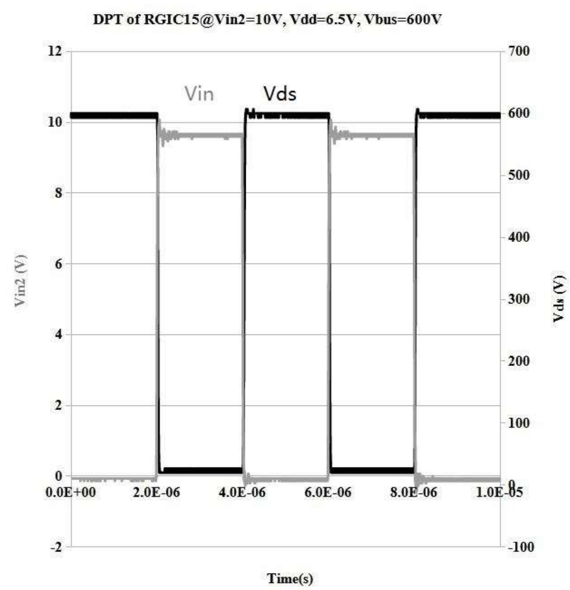
DPT test @V_{in}=6V, V_{dd2}=15V, V_{bus}=600V, R_{in2}=0, R_{dd}=0



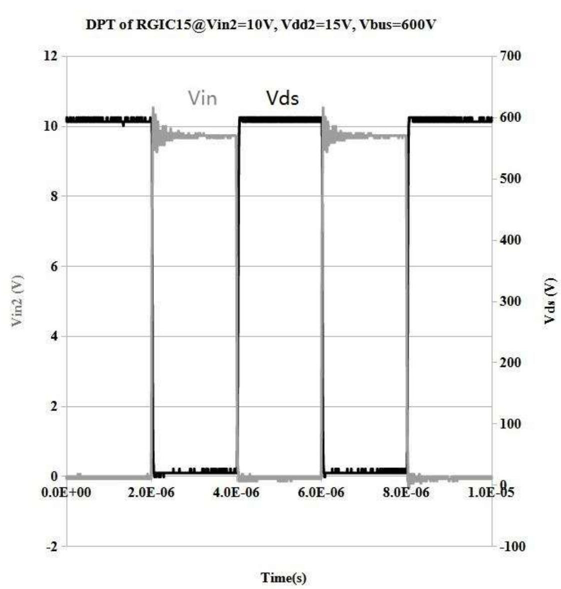
DPT test @V_{in}=6V, V_{dd2}=20V, V_{bus}=600V, R_{in2}=0, R_{dd}=0



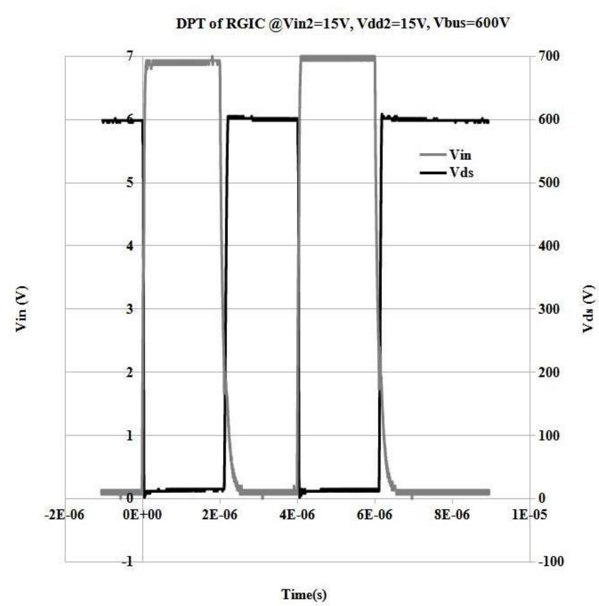
DPT test @V_{in2}=6V, V_{dd}=6.5V, V_{bus}=600V, R_{in}=0, R_{dd2}=0



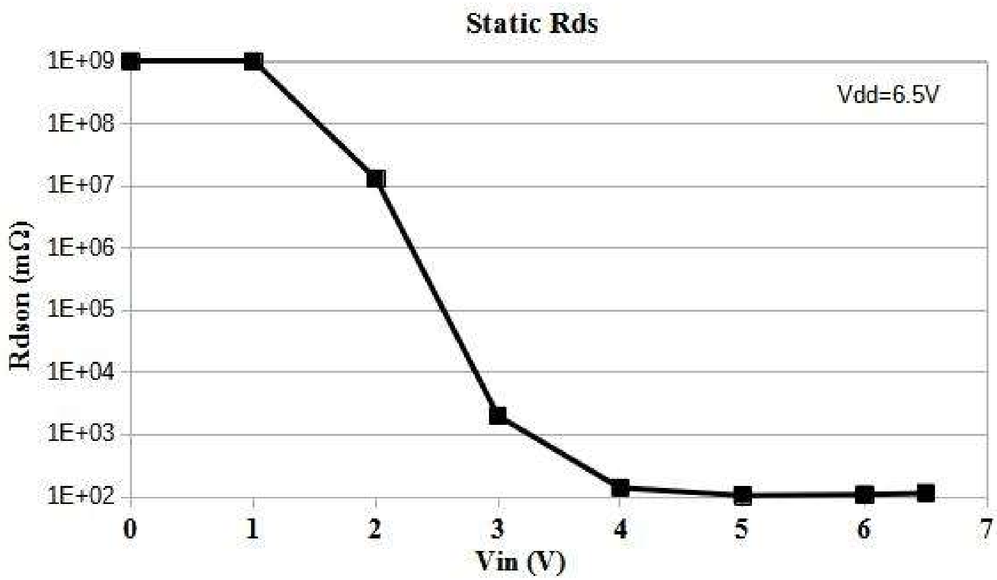
DPT test @V_{in2}=10V, V_{dd}=6.5V, V_{bus}=600V, R_{in}=0, R_{dd2}=0



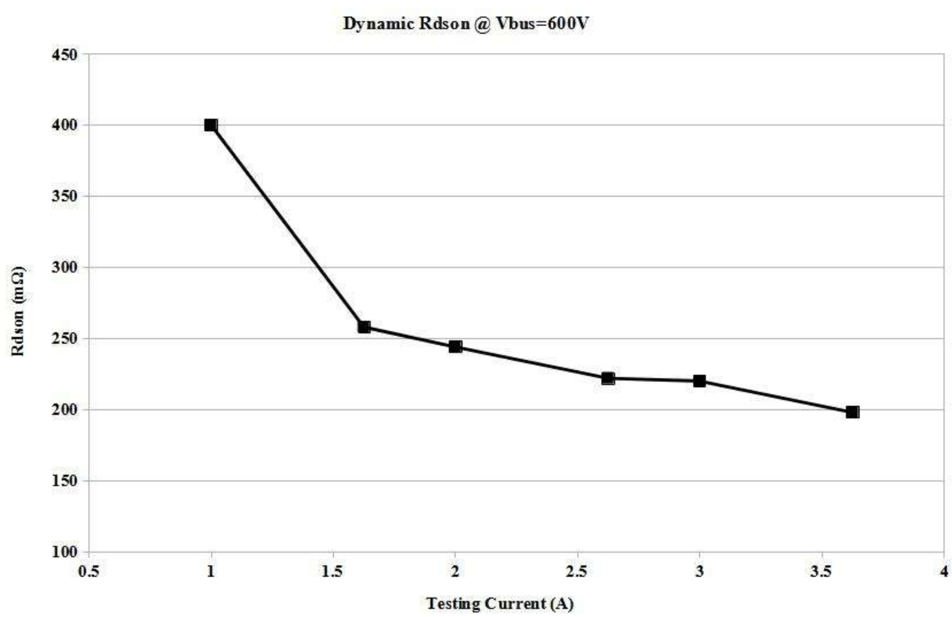
DPT test @V_{in2}=10V, V_{dd2}=15V, V_{bus}=600V, R_{in}=0, R_{dd2}=0



DPT test @V_{in2}=15V, V_{dd2}=15V, V_{bus}=600V, R_{in2}=1K, R_{dd2}=8K, C_{dd}=0.1uF

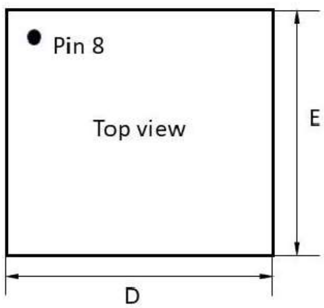


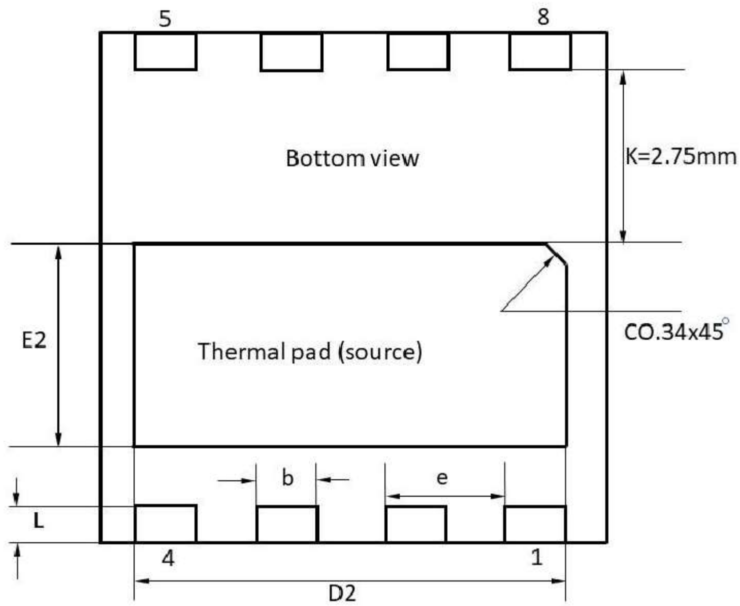
Rds versus V_{in} @V_{dd}=6.5V



Note: Dynamic R_{dson} data were captured the moment near the end of the second pulse, in order to exclude any influence of ringing and overshooting. Normally the dynamic Rdson is measured at 1 µs after IC turn-on.

Package Information

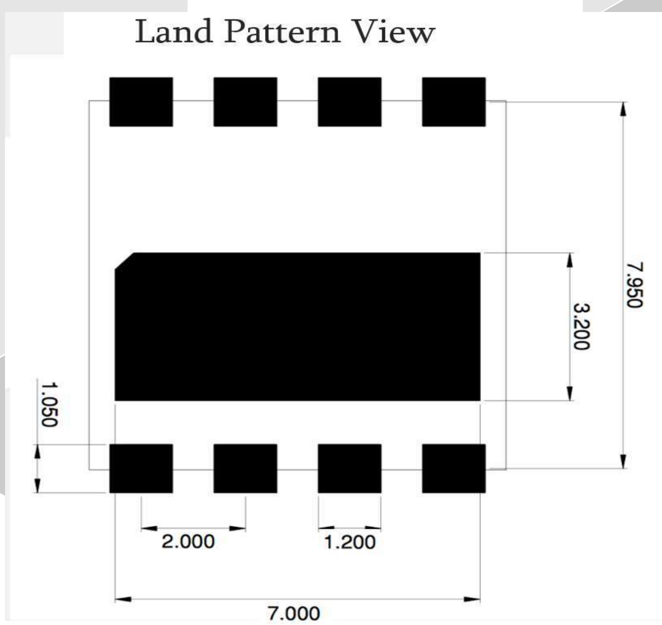




D=8; E=8; e=1.95; b=0.97; L=0.57; D2=6.82; E2=3.19

8LEAD DFN (8x8x0.75mm, Pitch 1.95mm)
IMPORTANT: Please connect the bottom thermal pad to the source electrode on PCB

Land Pattern View



Further information

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Data Source– Data here are based on recent tests but all parameters may not be up to date. Actual final test data from packaging production are available for selected customers upon request.